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LISTS OF SPECIES

Pisces, Anegada Bay protected area, Buenos Aires Province, Argentina

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ABSTRACT: We provide the first list of marine fish from Anegada Bay, a coastal protected area in Buenos Aires Province. Fish records were obtained from gillnets and recreational fishery captures. Thirty seven species belonging to 29 families and 18 orders were identified. The most numerous order was Perciformes with eight families and 10 species. *Odontesthes argentinensis, Micropogonias furnieri, Cynoscion guatucupa* and *Mustelus schmitti* were verified in all sampling sites and the last two were the most represented either in the experimental fishing and recreational captures. Presence of *Lagocephalus laevigatus* extended the so far known range distribution of this fish species, representing the southernmost records in Argentinean coastal waters. The fish fauna composition from Anegada Bay could be considered as from a transitional zone.

INTRODUCTION

Anegada Bay (39°50'51" S to 40°43'08" S and 62°28'44" W to 62° 03'00" W) represents a faunistic reserve of multiple uses since 2001 and comprises an extensive area encompassing the southern part of Buenos Aires Province (Argentina), being its southern area considered as part of north Patagonian region (Figure 1). From the marine biogeographical point of view, the study area is located close to the transition between the Magellanic Province and Argentine Province, both of them in Southwest Atlantic (López 1964; Balech and Erlich 2008).

Anegada Bay is a shallow coastal system with different environments such as islands, inlets, marshes, tidal plains, pebble-and-gravel beaches and sand beaches. The south part of Anegada Bay exhibits sand bars that are exposed during low tides, whereas coastal sediments are heterogeneous comprising sand, gravel, wave cut platforms and marshes. A distinctive characteristic is the presence of San Blas channel which is a tidal inlet system connecting Anegada Bay with the outer sea. This channel is 2.5 km wide, 22 m maximum depth and 12 km long (Cuadrado and Goméz in press). Water temperature ranges from 5 °C in winter to 21.7 °C in summer, whereas salinity ranges from 33.7 to 34.2 ups depending on Negro and Colorado rivers discharges and winds (Lucas *et al.* 2005). Although the bay provides critical habitats (i.e. forage, spawning and nursery sites) for many commercial and recreational fish species, little is known about fish richness and distribution.

The present paper summarizes and analyzes for the first time the fish records from this protected area.

MATERIALS AND METHODS

Fish records were obtained with different sampling designs. From October 2007 to August 2009 eight field samplings were performed using bottom gill nets. Three main areas were considered for fishing sampling: 1- Los Pocitos (40°28'02" S, 62°22'36" W), placed on the south flank of San Blas channel in a more shallow and weaker energy environment, situated inside Anegada Bay; 2- Punta Ramirez (40°31'17" S, 62°19'09" W) which is located at the mouth of a secondary tidal channel tributary of San Blas channel; 3- San Blas (40°31'48" S, 62°13'46" W) located on the north flank of San Blas channel, which is a high energy environment, near its opening to the sea.

At each site seven bottom gill nets (25 m length and 2 m height) with different mesh sizes (64, 70, 80, 105, 135, 150 and 170 mm between opposite knots) were used. Sampling depth ranged from 3 to 4.5 m at San Blas, 0.8 to 3 m at Punta Ramirez and 2.8 to 6.4 m at Los Pocitos. Samplings were always carried out during a nightly cycling tide. In turn, from June 2008 to May 2009 floating gill nets with different mesh sizes (15, 19, 21, 26, 32, 35 and 40 mm distance between opposite knots) were set on a monthly basis in two shallow water sites: 4- Sand Beach (40°34'14" S, 62°11'41" W); 5- Ría del Jabalí (40°36'04" S, 62°14'31" W). Finally, from October 2007 to December 2009 an angler survey program was developed based on inshore (Jabalí island coastline) and offshore captures obtained by the recreational fishery. The vessel fishing area covers approximately 15 km around San Blas village which is the only landing port (Figure 1).

All fish specimens were identified to species level according to Menni *et al.* (1984) and counted. The systematic list of species was made following Nelson (2006) whereas Craig and Hastings (2007), Smith and Craig (2007) and Irigoyen *et al.* (2008), were followed to classify *Acanthistius* species.

RESULTS AND DISCUSSION

A total of 37 species belonging to 29 families and 18 orders were identified. Chondrichthyes were represented by seven orders and eight families, while Osteichthyes

included 10 orders and 20 families and Petromizontida comprised only one species. Within Chondrichthyes, the orders Carcharhiniformes and Rajiformes were the best represented with three species each, belonging to two and one families, respectively. In the remaining orders of Chondrichthyes only one species was detected. In the case of Osteichthyes, the more numerous order was Perciformes with eight families and 10 species, followed by Pleuronectiformes with three families and four species and Atheriniformes with one family and three species. The order Clupeiformes was represented by two families and two species whereas remaining orders included only one species each (Table 1).

Jaureguizar *et al.* (2006) reported 41 fish species for the inner coastal shelf of northern Argentina, from which 26 were found in this study. Most of these species belong to the namely "*Variado Costero Bonaerense*" group, comprised by species inhabiting the coastal area between 34° to 41° S until 50 m depth (Angelescu and Prenski 1987; Carozza *et al.* 2001). Among the 46 species included in this group, *M. furnieri, C. guatucupa* and *M. schmitti* are the dominant and more important for the fisheries (Cosseau and Perrota 2000). In the study area the presence of these three species and *Odontesthes argentinensis* was verified in all sampling sites. Both *M. schmitti* and *C. guatucupa* were the most numerous in the experimental fishing captures representing 53 % and 23 % from total fish caught. In turn, for recreational fishery, both species were also the most represented, being *C. guatucupa* 65 % and *M schmitti* 11 % of harvested fishes.

The southernmost distribution of *Lagocephalus laevigatus*, previously known to Monte Hermoso (38°59'33" S, 61°15'55" W) (Cione *et al.*, 1999), is herein extended to Anegada Bay.

Based on these results, fish fauna composition from Anegada Bay could be considered as from a transitional zone, where three kind of fish fauna occur: a) Typical cold or temperate-cold waters fish (e.g. *Eleginops maclovinus*), that are common in south Patagonia, (López 1964); b) Temperate-warm waters species occasionally entering into the Magellanic Province (e.g. *Myliobatis goodei, Pomatomus saltatrix, Mustelus schmitti, Sympterygia bonapartii*) (López 1964; Krefft 1968); and c) Typical warm water species belonging to the Argentine Province (e.g. *Sympterygia acuta, Atlantoraja castelnaui, Micropogonias furnieri, Paralichthys orbignyanus, Trichiurus lepturus, Brevoortia aurea, Lycengraulis grossidens*). Such diversity may be supported by the complexity of oceanographic conditions found in Anegada Bay and surrounded areas given by freshwater discharges and a remarkable temperature and salinity amplitude.

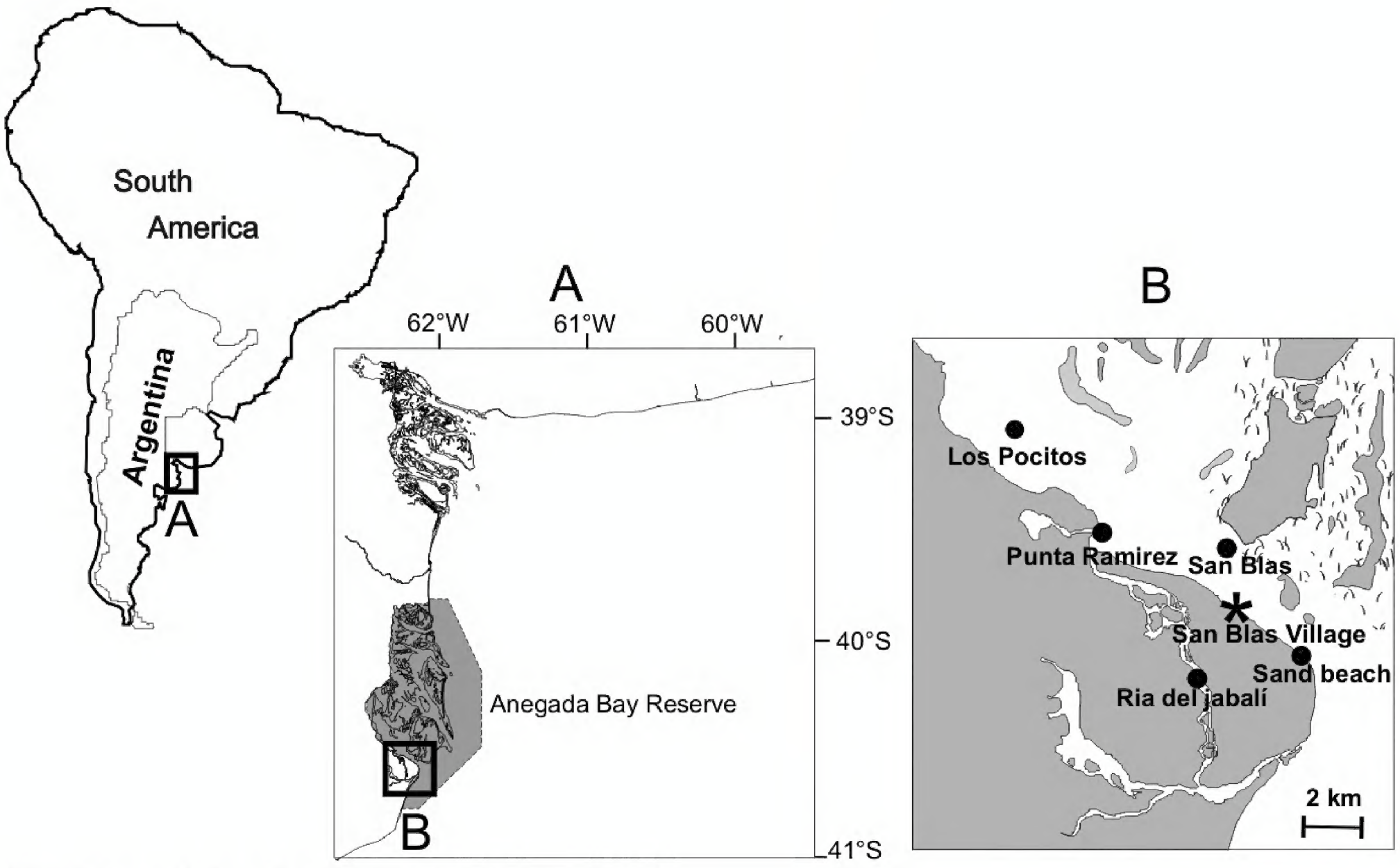

FIGURE 1. Geographic location of study area (A), and sampling sites (B).

Table 1. List of species indentified in Anegada Bay at each sampling sites: 1- Los Pocitos, 2- Punta Ramirez, 3-San Blas, 4- Sand Beach, 5-Ría del Jabalí, In- Inshore angler survey, and Of- offshore angler survey.

List of collected species	1	2	3	4	5	In	Of
PETROMIZONTIDA							
Petromyzontiformes							
Petromyzontidae							
Geotria australis Gray, 1851							X
CHONDRICHTHYES							
HOLOCEPHALI							
Chimaeriformes							
Callorhinchidae							
Callorhinchus callorynchus (Linnaeus, 1758)		X	X	X		X	X
ELASMOBRANCHII							
Lamniformes							
Odontaspididae							
Carcharias taurus Rafinesque, 1810							X
Carcharhiniformes							
Carcharhinidae							
Carcharhinus brachyurus (Günther, 1870)							X
Triakidae							
Galeorhinus galeus (Linnaeus, 1758)						X	X
Mustelus schmitti Springer, 1939	X	X	X	X	X	X	X
Hexanchiformes							
Hexanchidae							
Notorynchus cepedianus (Péron, 1807)	X		X			X	X
Squatiniformes							
Squatinidae							
Squatina guggenheim Marini, 1936	X	X	X				
Rajiformes							
Arhynchobatidae							
Atlantoraja castelnaui (Miranda Ribeiro, 1907)						X	X
Sympterygia acuta Garman, 1877			X	X		X	X
Sympterygia bonapartii Müller and Henle, 1841		X	X	X		X	X
Myliobatiformes							
Myliobatidae							
Myliobatis goodei Garman, 1885	X	X	X			X	X
ACTINOPTERYGII							
Anguilliformes							
Congridae							
Conger orbignianus Valenciennes, 1837						X	
Clupeiformes							
Clupeidae							
Brevoortia aurea (Spix and Agassiz, 1829)	X	X	X	X	X		
Engraulidae							
Lycengraulis grossidens (Agassiz, 1829)		X					
Siluriformes							
Ariidae							
Genidens barbus (Lacepède, 1803)						X	X
Batrachoidiformes							
Batrachoididae							
Porichthys porosissimus (Cuvier, 1829)	X	X	X	X		X	
Mugiliformes							
Mugilidae							
Mugil platanus Günther, 1880		X	X				
Atheriniformes							
Atherinopsidae							
Odontesthes argentinensis (Valenciennes, 1835)	X	X	X	X	X	X	X
Odontesthes platensis (Berg, 1895)				X		X	
Odontesthes smitti (Lahille, 1929)		X					
SCORPAENIFORMES							
Triglidae							
Prionotus punctatus (Bloch, 1793)			X				

Table 1. ***Continued.***

List of collected species	1	2	3	4	5	In	Of
Perciformes							
Carangidae							
Parona signata (Jenyns, 1841)	X		X			X	X
Eleginopsidae							
Eleginops maclovinus (Cuvier, 1830)		X			X		
Percophidae							
Percophis brasiliensis Quoy and Gaimard, 1825	X	X	X	X		X	X
Pomatomidae							
Pomatomus saltatrix (Linnaeus, 1766)		X	X			X	X
Sciaenidae							
Cynoscion guatucupa (Cuvier, 1830)	X	X	X	X	X	X	X
Menticirrhus americanus (Linnaeus, 1758)	X		X			X	X
Micropogonias furnieri (Desmarest, 1823)	X	X	X	X	X	X	X
Stromateidae							
Stromateus brasiliensis Fowler, 1906	X	X	X	X			
Trichiuridae							
Trichiurus lepturus Linnaeus, 1758							X
insertae sedis							
Acanthistius patachonicus (Jenyns, 1842)							X
Pleuronectiformes							
Cynoglossidae							
Symphurus jenynsi Evermann and Kendall, 1906	X						
Paralichthyidae							
Paralichthys orbignyanus (Valenciennes, 1839)		X	X		X	X	X
Paralichthys patagonicus Jordan, 1889		X			X	X	X
Pleuronectidae							
Oncopterus darwinii Steindachner, 1874			X				
Tetraodontiformes							
Tetraodontidae							
Lagocephalus laevigatus (Linnaeus, 1766)							X

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Literature Cited

Angelescu, V. and L.B. Prenski. 1987. Ecología trófica de la merluza común del Mar Argentino (Merlucciidae, *Merluccius hubbsi*). Parte 2. Dinámica de la alimentación analizada sobre la base de las condiciones ambientales, la estructura y las evaluaciones de los efectivos en su área de distribución. *Contribución - Instituto Nacional de Investigación y Desarrollo Pesquero* 561: 1-205.

Balech, E. and M. Erlich. 2008. Biogeographic scheme of the Argentine Sea. *Revista de Investigación y Desarrollo Pesquero* 19: 45-75.

Carozza, C., L. Navarro, A. Jaureguizar, C. Lasta, and M.B. Bertolotti. 2001. Asociación íctica costera Bonaerense "Variado Costero". Informe I. *Informe Interno Técnico - Instituto Nacional de Investigación y Desarrollo Pesquero* 38/01: 1-28.

Cione, A.L., J.R. Casciotta, J.M. Díaz de Astarloa and D. Figueroa. 1999. Southernmost occurrence of the rabbit fish *Lagocephalus laevigatus* (Teleostei: Tetraodontidae) in the Atlantic coast of Argentina. *Biogeographica* 75(1): 31-34.

Cousseau, M.B. and R.G. Perrotta. 2000. *Peces Marinos de Argentina. Biología, Distribución, Pesca*. Mar del Plata: Instituto Nacional de Investigación y Desarrollo Pesquero. 167p.

Craig, M.T. and P.A. Hastings. 2007. A molecular phylogeny of the groupers subfamily Epinephelinae (Serranidae) with a revised classification of the Epinephelini. *Ichthyological Research* 54: 1–17.

Cuadrado, D.G. and E.A. Gómez. In press. Geomorfología y dinámica del canal San Blas, Provincia de Buenos Aires (Argentina). *Latin American Journal of Sedimentology and Basin Analysis*. 17: 1-22.

Irigoyen, A.J., L. Cavaleri Gerardinger and A. Carvalho-Filho. 2008. On the status of the species of *Acanthistius* (Gill, 1862) (Percoidei) in the South-West Atlantic Ocean. *Zootaxa* 1813: 51-59.

Jaureguizar, A.J., R. Menni, C. Lasta and R. Guerrero. 2006. Fish assemblages of the northern Argentine coastal system: spatial patterns and their temporal variations. *Fisheries Oceanography* 15(4): 326-344.

Krefft, G. 1968. Neue und erstmalig nachgewiesene Knorpelfische aus dem Archibental des Südwestatlantiks einschliesslich einer Diskussion einiger *Etmopterus*- Arten südlicher Meere. Arch. FischWiss 19(1): 1-42.

López, R.B. 1964. Problemas de la distribución geográfica de los peces marinos sudamericanos. *Boletín del Instituto de Biología Marina* 7: 57-62.

Lucas, A.J., R.A. Guerrero, H.W. Mianzan, E.M. Acha and C.A. Lasta. 2005. Coastal oceanographic regimes of the Northern Argentine Continental Shelf. *Estuarine, Coastal and Shelf Science* 65: 405-420.

Menni, R.C., R.A. Ringuelet and R.H. Arámburu. 1984. *Peces marinos de la Argentina y Uruguay*. Buenos Aires: Editorial Hemisferio Sur. 359 p.

Nelson, J.S. 2006. *Fishes of the world*. New York: John Wiley and Sons. 601 p.

Smith, W.L. and T.M. Craig. 2007. Casting the Percomorph net widely: The importance of broad taxonomic sampling in the search for the placement of Serranid and Percid fishes. *Copeia* 1: 35–55.

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